Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

1.   (Currently Amended) A coil assembly for a probe coil to be used in a system for

detecting a nuclear quadrupole resonance signal in a substance, the coil assembly comprising a

pair of opposed coil sections, each section consisting of a spiral coil arrangement having a spiral

coil radially convolving outwardly from and about a centre point of the coil section, wherein the

spiral coil arrangement is configured in a saddle shape, the saddle shape having a central portion

and a pair of coextending outer portions, the central portions of the sections being disposed in

opposing spaced apart relationship about a common axis coincident with the centre points of

each coil section, and the corresponding coextending outer portions of the sections being

disposed in confronting opposed alignment with each other to circumscribe a scanned volume

within which the substance is to be disposed.

2.   (Canceled).

3.   (Previously Presented) A coil assembly according to claim 1, wherein the winding of the

coil is arranged so that the coil pitch varies along the radius of the coil.

4.   (Previously Presented) A coil assembly according to claim 1, wherein the coil winding

has a transverse extent that varies along the radius to maintain a constant gap between the

windings.

5.   (Previously Presented) A coil assembly according to claim 1, wherein the coil winding

varies in accordance with a logarithmic winding scheme defined by the expression:

$$r_{n+1} / r_n = \ln(1 + a(n+1)) / \ln(1 + an)$$

where n is the number of spiral turns, a is a parameter used for optimisation, r_{n+1} and r_n are

distances from the centre of the spiral to the $(n+1)$-th and the n-th turns.

6.   (Canceled).

7.   (New) A coil assembly for a probe coil to be used in a system for detecting a nuclear

quadrupole resonance signal in a substance, the coil assembly comprising a pair of opposed coil

sections, each section consisting of a spiral coil arrangement having a spiral coil radially

convolving outwardly from and about a centre point of the coil section, wherein the coil winding

varies in accordance with a logarithmic winding scheme defined by the expression:

$$r_{n+1} / r_n = \ln(1 + a(n+1)) / \ln(1 + an)$$

where n is the number of spiral turns, a is a parameter used for optimisation, r_{n+1} and r_n are

distances from the centre of the spiral to the $(n+1)$-th and the n-th turns.

8.   (New) A coil assembly according to claim 7, wherein the winding of the coil is arranged

so that the coil pitch varies along the radius of the coil.

9.   (New) A coil assembly according to claim 7, wherein the coil winding has a transverse

extent that varies along the radius to maintain a constant gap between the windings.